UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,858	11/19/2003	Gary R. Flauaus	MCD128	7100

48929 7590 07/07/2008

HENSLEY KIM & HOLZER, LLC
1660 LINCOLN STREET
SUITE 3000
DENVER, CO 80264

EXAMINER	
NEURAUTER, GEORGE C	

ART UNIT	PAPER NUMBER
2143	

MAIL DATE	DELIVERY MODE
07/07/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/716,858	FLAUAUS ET AL.	
	Examiner	Art Unit	
	George C. Neurauter, Jr.	2143	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 January 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 1 and 3-26 are currently presented and have been examined.

This action includes the text rejection of claim 8 that was inadvertently omitted from the final rejection mailed 3 April 2008.

Response to Arguments

Applicant's arguments filed 7 January 2008 have been fully considered but they are not persuasive.

The Applicant argues that O'Donnell did not teach or reasonably suggest performing computation with gathered data traffic statistics to detect congestion at a number of ports. The Examiner respectfully does not agree. O'Donnell expressly disclosed that the congestion analysis module "generates statistical information concerning the performance of fibre channel links that connect internal port 1 6 to the various F_ports. This statistical information is presented to host client 13 in the format of a Monitor Information Record (see FIG. 4)..." (column 4, lines 30-35) Within this record is a number of "statistical counters" which have "port operation parameters" that denote "Number of link failures" and "Number of class 3 frames discarded" (see Table 1 in column 5). It is clear from these teachings in O'Donnell that these are parameter meant

to detect congestion at the ports, therefore, O'Donnell clearly teached and/or reasonably suggested that the congestion analysis module does in fact detect congestion and reports such congestion in the manner shown above.

The Applicant further argues that O'Donnell fails to teach or reasonably suggest updating the congestion records for the ports with detected congestion to indicate a congestion type based on the performed computations. Again, the Examiner respectfully does not agree in view of the disclosures of O'Donnell. As shown above in Table 1 in column 5, O'Donnell teached distinct "port operation parameters". It is clear that O'Donnell teached and/or reasonably suggested distinct types of parameters including different types of congestion as also shown above by the Examiner. Therefore, O'Donnell did teach or/reasonably suggest different congestion types.

The Applicant further argues that O'Donnell does not teach or reasonably suggest periodically repeats the gathering, the performing, and the updating operations upon the expiration of a same time period. The Examiner respectfully does not agree. O'Donnell did teach this limitation (see at least column 4, lines 52-67). O'Donnell further disclosed that "In accordance with this invention, the time that has elapsed since the last reading of port statistics is operative to control the

method/apparatus of the invention to issue a read port statistics command to the FC switch." (see column 3, lines 20-24). Therefore, O'Donnell did teach and/or reasonably suggest this limitation.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 7, 10-12, 18-22, and 24-26 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 6,381,642 B1 to O'Donnell et al.

Regarding claim 1, O'Donnell disclosed a switch for use in a data storage network ("fibre channel"), comprising:

a plurality of ports each comprising a receiving device for receiving data from a link connected to the port and a

transmitting device for transmitting data onto another link connected to the port; (see at least column 1, lines 52-60)

a plurality of control circuits each associated with one of the ports, wherein each of the control circuits collects data traffic statistics and port state information for the associated port; memory for storing a congestion record for each of the ports; (see at least column 2, lines 47-52 and column 4, lines 40-52)

and a congestion analysis module ("management director") gathering at least a portion of the data traffic statistics and port state information for the ports, performing computations with the gathered port statistics and port state information to detect congestion at the ports, and updating the congestion records for the ports with detected congestion. (see at least column 4, lines 30-52) (see also column 5, Table 2, wherein the congestion analysis module updates information regarding "number of class 3 frames discarded", "number of link failures", and "frame pacing limit")

Regarding claim 2, O'Donnell disclosed the switch of claim 1, wherein the module periodically repeats the gathering, the performing, and the updating upon expiration of a sample time period. (see at least column 4, lines 63-67)

Regarding claim 3, O'Donnell disclosed the switch of claim 2, wherein the congestion records comprise counters for a set of congestion types and the updating of the congestion records comprises incrementing the counters for the ports for which the detected congestion corresponds to one of the congestion types. (see at least column 2, lines 47-52 and column 4, lines 40-52) (also note column 5, lines 1-25, wherein the counters count an accumulated "number" of a certain value and are therefore "incremented")

Regarding claim 7, O'Donnell disclosed the switch of claim 1, wherein the gathered port statistics and port state information include separate sets of data for the receiving device and the transmitting device for the ports and wherein the performing computations comprises detecting congestion for the ports in the receiving device and the transmitting device based on the separate sets of data. (see at least column 4, lines 46-62, wherein each of the ports has its own associated separate set of data collected)

Regarding claim 10, O'Donnell disclosed a method of managing congestion in a data storage fabric having a set of switches with input/output (I/O) ports and links connecting the ports for transferring digital data through the fabric, comprising:

receiving a first set of congestion data from the switches in the fabric, the first set comprising port-specific congestion data for the ports in the switches at a first time; receiving a second set of congestion data from the switches in the fabric, the second set comprising port-specific congestion data for the ports in the switches at a second time; and processing the first set and the second set of congestion data to determine a level of congestion at the ports. (see at least column 2, lines 35-39 and 47-52, column 4, lines 40-52, and column 6, lines 28-48) (also note column 1, lines 15-46; the disclosures of O'Donnell cover a plurality of switches and therefore, multiple sets of data can be received by multiple switches)

Regarding claim 11, O'Donnell disclosed the method of claim 10, wherein the processing comprises determining a change in the congestion data between the first and the second times. (see at least column 2, lines 12-20)

Regarding claim 12, O'Donnell disclosed the method of claim 11, wherein the determined change is used to update a set of congestion counters for each of the ports of each of the switches. (see at least column 4, lines 30-52)

Regarding claim 18, O'Donnell disclosed the method of claim 10, wherein the processing includes determining a source of the

congestion in the fabric based on the congestion data. (see at least column 2, lines 12-20)

Regarding claim 19, O'Donnell disclosed a method for managing congestion in a fabric having a plurality of multi-port switches, comprising:

at each switch in the fabric, monitoring bi-directional traffic pattern data for each switch port for indications of congestion and when congestion is indicated for one of the switch ports, updating a congestion record for the congested port based on the monitored traffic pattern data; (see at least column 2, lines 47-52 and column 4, lines 30-52) (also note column 1, lines 15-46; the disclosures of O'Donnell cover a plurality of switches)

operating the switches to transfer at least portions of the congestion records from each of the switches to a network management platform; and at the network management platform, processing the transferred portions of the congestion records to determine a congestion status for the fabric. (see at least column 2, lines 35-39 and 47-52, column 4, lines 40-52, and column 6, lines 28-48)

Regarding claim 20, O'Donnell disclosed the method of claim 19, further comprising performing congestion recovery comprising

initiating manual intervention procedures or transmitting a congestion alleviation command to one of the switches based on the determined congestion status for the fabric. (see at least column 2, lines 12-20)

Regarding claim 21, O'Donnell disclosed the method of claim 19, wherein the processing comprises detecting a delta between the transferred portions of the congestion records and a set of previously received congestion records, and further wherein the congestion status comprises a congestion level and a congestion type for congested ones of the ports. (see at least column 2, lines 12-20 and 47-52 and column 4, lines 40-52)

Regarding claim 22, O'Donnell disclosed the method of claim 21, wherein the processing further includes determining a source of congestion in the fabric based on the types of congestion at the ports. (see at least column 2, lines 12-20)

Regarding claim 24, O'Donnell disclosed the method of claim 19, wherein the monitoring at the switches is performed independently in a received direction and in a transmit direction for each of the ports. (see at least column 4, lines 46-62)

Regarding claim 25, O'Donnell disclosed the switch of claim 1, wherein the plurality of control circuits each collect port

state information for the associated port. (see at least column 2, lines 47-52 and column 4, lines 40-52)

Regarding claim 26, O'Donnell disclosed the switch of claim 25, wherein the plurality of control circuits collect the data traffic statistics for each active port of the switch. (see at least column 2, lines 47-52 and column 4, lines 40-52)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 6, 9, and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Donnell in view of US Patent 7,275,103 B1 to Thrasher et al.

Regarding claim 6, O'Donnell disclosed the switch of claim 1, wherein the gathered port statistics comprise TX link utilization, RX link utilization, queuing latency, internal port transmit busy timeouts, Class 3 frame flush counters/discard frame counters, and destination statistics. (see at least column 5, Table 2, particularly "number of" words and frames received and transmitted, "number of class 3 frames discarded", "number of link failures", "frame pacing limit", and "number of link failures")

O'Donnell did not expressly disclose the use of TX BB_Credit levels, RX BB_Credit levels, configured RX BB_Credit, or link distance as port statistics, however, Thrasher discloses these port statistics in the context of monitoring ports within a switch in a data storage network (see column 4, lines 34-50).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the port statistics as described in Thrasher to monitor the switch as described in O'Donnell since such port statistics are used to monitor ports within a switch in a data storage network as both described in O'Donnell and Thrasher and, therefore, using the port statistics as described in Thrasher would have predictably resulted in a switch that monitors its ports for the statistical information as described in Thrasher.

Regarding claim 9, O'Donnell disclosed the switch of claim 1.

O'Donnell did not expressly disclose the switch further comprising generating a Congestion Threshold Alert (CTA) indicating one or more congestion statistics to a log or management interface, however, Thrasher does disclose this limitation in the context of data storage network switches and the monitoring of its ports for congestion information (see at least column 4, lines 51-56 and column 6, lines 41-63).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of these references since the combination of the switch of O'Donnell to include the functionality of generating an alert to a log or management interface would have been predictably successful to one of ordinary skill in the art since O'Donnell discloses providing information to a management interface from a switch (see at least column 2, lines 12-20). Therefore, to integrate the functionality of the switches of these references would have been obvious to one of ordinary skill and would have predicted a successful combination.

Regarding claim 16, O'Donnell disclosed the method of claim 10.

O'Donnell did not expressly disclose generating a congestion status display for viewing on a user interface comprising a graphical representation of the data storage fabric, the congestion status display including congestion indicators corresponding to the determined levels of congestion at the ports, however, Thrasher did disclose these limitations (see at least column 15, line 59-column 16, line 48).

One of ordinary skill would have found it obvious that using generating a user interface to display the congestion information to a user would enable a user to observe the

operation of the network and be able to enact changes in order to avoid network congestion which is the main objective of both references. Therefore, it would have been obvious to one of ordinary skill to combine the teachings of these references to achieve such an improved system.

Regarding claim 17, O'Donnell and Thrasher disclose the method of claim 16.

O'Donnell disclosed wherein the congestion data comprises detected types of congestion for the ports and the congestion status display includes congestion type indicators. (see at least column 2, lines 47-52 and column 4, lines 40-52)

Claims 8, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Donnell in view of Dropps.

Regarding claim 8, O'Donnell disclosed the switch of claim 1.

O'Donnell did not disclose, however, Dropps did disclose wherein the memory further stores a set of congestion threshold values and wherein the performing congestion detection computations with the module comprises determining whether the gathered port statistics and port state information exceed the congestion threshold values. (see at least paragraphs 0038, 0150-0151 and 0163)

One of ordinary skill would have found it obvious to combine the teaching of these references since the use of thresholds enables the triggering of some action in the event of some sort of existing condition such as a problem within a system such as network congestion as described in both O'Donnell and Dropps. Since both O'Donnell and Dropps monitor congestion within a switch, one of ordinary skill would have predicted that the use of thresholds in the switch of O'Donnell would determine a level of congestion to the extent that congestion would then be able to be detected. Therefore, it would have been obvious to achieve the claimed invention.

Regarding claim 13, O'Donnell disclosed the method of claim 12.

O'Donnell did not expressly disclose wherein the level of congestion is determined by comparing the congestion counters to threshold levels for a set of congestion types, however, Dropps did disclose these limitations in the context of monitoring congestion within a switch (see at least paragraphs 0038, 0150-0151 and 0163).

One of ordinary skill would have found it obvious to combine the teaching of these references since the use of thresholds enables the triggering of some action in the event of some sort of existing condition such as a problem within a

system such as network congestion as described in both O'Donnell and Dropps. Since both O'Donnell and Dropps monitor congestion within a switch, one of ordinary skill would have predicted that the use of thresholds in the switch of O'Donnell would determine a level of congestion to the extent that congestion would then be able to be detected. Therefore, it would have been obvious to achieve the claimed invention.

Regarding claim 14, O'Donnell and Dropps disclosed the method of claim 13.

O'Donnell disclosed displaying on a user interface at least a portion of the congestion counters (see at least column 2, lines 12-20 and column 6, lines 40-59).

O'Donnell did not expressly disclose receiving from a user interface at least a portion of the threshold levels, however, O'Donnell does disclose receiving from a user interface configuration information concerning monitoring information within a switch (see at least column 4, lines 53-62). Dropps discloses threshold levels as described above regarding claim 13.

It would have been obvious to one of ordinary skill in the art to send threshold levels from a user interface to a switch to allow the switch to accept threshold levels from a user interface in order to set the switch to trigger in the event of

congestion in a manner that is desired by a user monitoring the switch in order to detect congestion in the manner disclosed by O'Donnell.

Claims 4, 5, 15, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Donnell in view of Dropps and in further view of US Patent 7,151,744 B2 to Sarkinen et al.

Regarding claim 4, O'Donnell disclosed the switch of claim 3.

O'Donnell discloses wherein the congestion types comprise resource limited congestion. (see column 5, Table 2, specifically "frame pacing limit")

O'Donnell did not expressly disclose backpressure congestion and over-subscription congestion types, however, Dropps did disclose over-subscription congestion as a statistic used to monitor switches (see at least paragraphs 0044-0045, 0186 and 0191).

One of ordinary skill in the art would have found it obvious to use over-subscription congestion as a congestion type since it is known in the art as shown in Dropps that over-subscription is a common type of congestion experienced by switches within a data storage network (see at least paragraph 0082) and to monitor for such congestion in the context of monitoring congestion as described in both O'Donnell and Dropps

would have predictably resulted in a switch that is able to monitor for more known congestion types.

O'Donnell and Dropps did not expressly disclose a backpressure congestion type, however, Sarkinen did disclose backpressure congestion (see "backpressure" as referred to throughout the reference).

One of ordinary skill in the art would have found it obvious to use backpressure congestion as a congestion type since it is known in the art as shown in Sarkinen (see at least column 18, lines 51-59) that over-subscription is a common type of congestion experienced by switches within a data storage network and to monitor for such congestion in the context of monitoring congestion as described in O'Donnell, Dropps, and Sarkinen would have predictably resulted in a switch that is able to monitor for more known congestion types.

Claims 15 and 23 are also rejected since these claims recite substantially the same limitations as recited in claim 4.

Regarding claim 5, O'Donnell, Dropps, and Sarkinen disclosed the switch of claim 4.

O'Donnell, Dropps, and Sarkinen did not expressly disclose wherein the module performs a second gathering of a second portion of the data traffic statistics for ones of the ports for which the detected congestion has the backpressure congestion

type of congestion and then processes the second portion of the data traffic statistics to identify a source of backpressure within the switch.

One of ordinary skill in the art would have found it obvious to collect more data traffic statistics when backpressure is detected in order to determine the source of the backpressure within the switch since it is within the knowledge of one of ordinary skill in the art concerning backpressure as it is known that backpressure occurs when an queue of a switch is overloaded since the queue's buffers are full and cannot receive data without dropping information and the sending of information to the queue is stopped. Based on the sending of information to the queue, it can be determined which transmitting port is causing the backpressure by observing which transmitting ports within the switch are sending the information to the queue. Therefore, by use of the data statistics used in O'Donnell, it would have been predictable by one of ordinary skill that using additional data traffic statistics would help determine the cause of the backpressure and, therefore, relieve the backpressure and avoiding congestion within the switch.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George C. Neurauter, Jr. whose telephone number is 571-272-3918. The examiner can normally be reached on Monday-Friday 9am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn, can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/George C. Neurauter, Jr./
Primary Examiner, Art Unit 2143